Section 903. ADMIXTURES AND CURING MATERIALS FOR CONCRETE

903.01 Air-Entraining Admixtures for Concrete. Conform to ASTM C 260. Air entraining admixtures must be selected from the Qualified Products List.

903.02 Calcium Chloride Concrete Accelerators. Calcium chloride shall not be used in prestressed concrete, concrete for bridge superstructure, concrete for bridge railings, or concrete containing galvanized steel or aluminum.

Calcium chloride for use in flake or pellet form for on-the-job preparation of admixture solutions shall conform to the requirements of ASTM D 98 for 77 percent Grade or 94 percent Grade. The percentage of calcium and magnesium chlorides will be determined according to MTM 603 and ASTM D 345. Supply Type S (solid) material in flake or pellet form.

Calcium chloride admixture, delivered to the job in solution form, shall conform to the following requirements for chemical composition:

Calcium Chloride, $CaCl_2$(anhydrous)	32.0-35.0%
Total magnesium as $MgCl_2$	1.0% max.
Total alkali chlorides calculated as NaCl	2.0% max.
Other impurities	0.5% max.

903.03 Chemical Admixtures. Chemical admixtures used in Portland cement concrete must be selected from the Qualified Products List. The chloride ion content for any chemical admixture shall not exceed 0.5 percent by weight of the admixture.

The following ASTM C 494 nomenclature is used for chemical admixtures.

- Type A: water-reducing admixtures
- Type C: accelerating admixtures
- Type D: water-reducing and retarding admixtures
- Type E: water-reducing and accelerating admixtures
- Type F: water-reducing, high range admixtures
- Type G: water-reducing, high range, and retarding admixtures

Chemical admixture not included in ASTM C 494 are referenced as follows

- Type MR: water-reducing, mid-range admixtures
- Type MRR: water-reducing, mid-range, and retarding admixtures

903.04 Latex Admixture. Formulated latex admixture for modifying mortar or concrete mixtures shall be a non-toxic, film forming, polymeric emulsion to which all stabilizers have been added at the point of manufacture and shall be homogeneous and uniform in composition.

A. **Physical Properties.** The latex styrene butadiene modifier shall meet the following requirements:

Percent solids	46.0 - 49.0
pH, as shipped	8.5 - 11.0
Shelf life, minimum	2 years
Color	White

B. **Storage.** Latex admixtures shall be protected from freezing and from prolonged exposure (10 days) to temperatures above 85 °F.

C. **Polypropylene Fibers.** Use ¾ inch long, 100 percent virgin polypropylene fibers conforming to the requirements of ASTM C1116, Type III.

903.05 Concrete Curing Materials for Pavements.

A. **White Membrane Curing Compound.** White membrane curing compound for curing concrete shall conform to ASTM C 309, Type 2.

The compound shall be packaged in clean containers. The compound shall be thoroughly agitated to a uniform consistency with the pigment uniformly suspended before transferring the compound between containers and before use.

B. **Transparent Membrane Curing Compound for Base Course.** Transparent membrane curing compound for curing base course concrete shall conform to ASTM C 309, Type 1-D, Class B, with fugitive dye.

903.06 Concrete Curing Materials for Structures.

A. **White Membrane Curing Compound for Bridge Decks.** White membrane curing compound for curing concrete bridge decks shall be a white-pigmented, modified, linseed oil based material either water soluble or an emulsion type and shall conform to ASTM C 309, Type 2 compounds.

The compound shall be packaged in clean containers. The compound shall be thoroughly agitated to a uniform consistency with the pigment uniformly suspended before transferring the compound between containers and before use.

B. **Transparent Membrane Curing Compound.** Transparent membrane curing compound for curing structural concrete shall conform to ASTM C 309, Type 1-D, Class B, with fugitive dye.

C. **Insulating Blankets.** Insulating blankets shall meet Federal Specification HH-1-521e, Insulation, Building, Mineral-Wool; Batts, Loose-Fill, and Granular-Fill, Type 1-Batts, Class C, with enveloping membranes.

The thermal conductivity (k) of the insulating blanket tested according to ASTM C 177 shall not exceed 0.27 BTU per hour per square foot temperature gradient of one degree F per inch of thickness at a mean temperature of 75 °F.

The insulating blanket shall be completely enclosed in liners bonded to both sides of the insulating mat.

Insulating blankets shall have either the minimum thickness or the minimum R value specified in Table 706-2.

D. **Polystyrene Insulation.** Polystyrene insulation shall be expanded polystyrene cut from preformed material having an average cell diameter of less than 0.04 inches.

The thermal conductivity (k) of the material tested according to ASTM C 177, shall not exceed 0.27 BTU per hour per square foot for a temperature gradient of one degree F per inch of thickness at a mean temperature of 75 °F. The material shall also meet the following.

Property	Requirements	ASTM Method
Density, lb/ft^3	0.90 min	C 303
Compressive strength, psi	9.0 min	D 1621
Flexural strength, psi	25.0 min	C 203
Water absorption, % by vol	2.0 max	C 272